

CLAIMS

What is claimed is:

- 1 1. A method for organizing and presenting material content on a display to a viewer, the
2 method comprising:
3 mapping a plurality of display windows within a virtual three-dimensional space so
4 that each display window is allocated a specific and predetermined position in
5 the space,
6 rendering each display window in three-dimensional perspective according to its
7 position and angle relative to a viewer's virtual position in the virtual space,
8 cross-referencing the position of each display window to a storage location of the
9 material content that is designated to be rendered in that particular display
10 window at a particular time based on at least one predetermined condition,
11 allocating at least part of the three-dimensional virtual space to display windows
12 whose content is not chosen or determined by the viewer,
13 selecting, retrieving and preparing material content for possible subsequent display,
14 according to a predetermined algorithm,
15 selecting and rendering prepared material content within its cross- referenced display
16 window, according to a predetermined algorithm,
17 providing a means of virtual navigation that changes the viewer's position in the space
18 in such a manner as to simulate movement through a plurality of predefined
19 channels in the virtual space.
- 1 2. A method according to claim 1 wherein the display windows are positioned in the
2 three-dimensional virtual space in such a manner as visually to represent exterior surfaces of
3 three-dimensional objects.
- 1 3. A method according to claim 1 wherein a three-dimensional virtual universe
2 comprises at least two three-dimensional virtual spaces.

- 1 4. A method according to claim 3 wherein at least two of the virtual spaces are
2 connected.
- 1 5. A method according to claim 1 wherein the material content comprises any one of
2 HTML pages, XML pages, multimedia presentations, VRML, data, numbers, text, still
3 images such as photographs or graphics, moving images, holograms, virtual control panels
4 and sound files.
- 1 6. A method according to claim 1 wherein each display window comprises one of a
2 parallelogram, an ellipse, a scroll, a curved concave and/or convex surface, a polygon with
3 straight and/or curved sides, a polyhedron with straight and/or curved edges, an elliptical
4 solid, and an empty or amorphous space.
- 1 7. A method according to claim 1 wherein each unique position of a display window is
2 identified by numerical coordinates.
- 1 8. A method according to claim 7 wherein the numerical coordinates refer to axes within
2 the space.
- 1 9. A method according to claim 1 wherein at least some of the material content is
2 retrieved from a network.
- 1 10. A method according to claim 1 wherein the retrieving step comprises retrieving at
2 least some of the content from a local or remote storage medium.
- 1 11. A method according to claim 1, further comprising providing an interaction means
2 that enables the viewer to interact with the material content in at least one of the display
3 windows.

1 12. A method according to claim 11 wherein the interaction with material content occurs
2 while the material content remains in situ in its cross referenced display window within the
3 three-dimensional virtual space.

1 13. A method according to claim 11 wherein the interaction with material content occurs
2 by displaying the material content other than in situ in its cross referenced display window.

1 14. A method according to claim 1 wherein the predetermined condition for cross
2 referencing comprises receiving financial consideration from a real commercial concern.

1 15. A method according to claim 1 wherein a part of the three-dimensional virtual space
2 comprises cross-referenced content material that is mainly determined by the viewer.

1 16. A method according to claim 1 wherein the channels may be straight, curved, round
2 or irregular.

1 17. A method according to claim 1 wherein at least some of the channels are arranged in
2 a grid-like pattern.

1 18. A method according to claim 1 wherein the three-dimensional virtual space is a
2 representation of a geographical landscape.

1 19. A method according to claim 18 wherein the geographical landscape is an urban
2 landscape.

1 20. A method according to claim 19 wherein the urban landscape is a visual
2 representation of a town or city, the channels are visual representations of roads, and at least
3 one of the display windows is a visual representation of a retail shop window arranged on
4 either side of a road.

1 21. A method according to claim 19 wherein the town or city is an actual town or city
2 that exists or did exist in the physical world.

1 22. A method according to claim 1 wherein the three-dimensional virtual space is a visual
2 representation of the inside of a department store and the channels are visual representations
3 of aisles in the store and the display windows are visual representations of shop floor
4 displays in the store.

1 23. A method according to claim 1 wherein the three-dimensional virtual space is a visual
2 representation of the inside of a supermarket and the channels are visual representations of
3 aisles in the supermarket and the display windows are visual representations of shelves in the
4 supermarket.

1 24. A method according to claim 1 wherein the three-dimensional virtual space is a visual
2 representation of the inside of a shopping mall and the channels are visual representations of
3 walkways in the shopping mall and the display windows are visual representations of the
4 shop-fronts in the mall.

1 25. A method according to claim 1 wherein the three-dimensional virtual space is a visual
2 representation of the inside of a library and the channels are visual representations of aisles in
3 the library and the display windows are visual representations of library shelves.

1 26. A method according to claim 1 wherein the three-dimensional virtual space contains
2 at least one navigational reference object at a predetermined position.

1 27. A method according to claim 26 wherein the navigational reference object comprises
2 any one of a gateway, landmark, ambient condition and advertisement.

1 28. A method according to claim 1 wherein the height of virtual three-dimensional
2 structures in the three-dimensional space is varied to aid navigation.

1 29. A method according to claim 27 wherein the advertisement is rendered in a way
2 similar to the material content of a display window and is specified by an actual commercial
3 enterprise or other organization or entity in exchange for actual financial payments.

1 30. A method according to claim 1 whereby sets of material content, associated by one or
2 more characteristics, are cross referenced to display windows that are spatially grouped
3 together in the three-dimensional virtual space.

1 31. A method according to claim 1 whereby the designation of material content for
2 rendering in a display window at a particular position at a particular time is conditional upon
3 one or more of the following: the number, behavior and/or nature of viewers who navigate to
4 or near that position in the three-dimensional virtual space; the nature of material content in
5 other display windows near that position; the availability of the display window at the
6 selected position; restrictions on the type of material content being cross referenced; other
7 requirements.

1 32. A method according to claim 1 wherein the viewer is prevented from navigating into
2 a restricted area of the three-dimensional space unless the viewer fits a certain profile or
3 fulfills certain predetermined conditions.

1 33. A method according to claim 1 wherein the virtual space is initially rendered such
2 that the viewer is positioned at one of a number of predetermined points of entry into the
3 virtual space.

1 34. A method according to claim 33 wherein the point of entry is the viewer's destination
2 after leaving another three-dimensional virtual space.

1 35. A method according to claim 1 comprising providing a first system for rapid viewer
2 movement through the three-dimensional virtual space wherein there are predetermined start
3 and stop positions, so as to simulate travel via an underground railway, an over-ground
4 railway, or an elevated railway or cable-car.

1 36. A method according to claim 1 comprising providing a second system for rapid
2 viewer movement through the three-dimensional virtual space wherein the viewer can
3 determine the locations for starting and stopping, so as to simulate travel via a taxi or
4 helicopter.

1 37. A method according to claim 35 or claim 36 wherein the viewer can simulate
2 movement through the three-dimension virtual space only by the first or second system for
3 rapid viewer movement and via the channels and cannot transfer from one position to another
4 position other than by these mechanisms.

1 38. A method according to claim 1 comprising displaying to the viewer the three-
2 dimensional virtual space from an elevated perspective looking downwards at an angle from
3 a simulated height or a bird's-eye perspective looking directly downwards from a simulated
4 height.

1 39. A method according to claim 1 comprising displaying the layout of the three-
2 dimensional virtual space on a two-dimensional or three-dimensional topological map.

1 40. A method according to claim 39 wherein the map highlights any one or more of the
2 following: the predetermined points of entry into the three dimensional virtual space, the
3 fixed start and stop locations of the rapid viewer movement mechanisms, and navigational
4 reference objects.

1 41. A method according to claim 1 in which the predetermined algorithm for rendering
2 (or for the preparation for rendering) of material content for the display windows in the three-
3 dimensional virtual space comprises the dynamic selection of a subset of the display
4 windows, rendering their cross-referenced material content to memory, and then copying the
5 rendered material content into their designated display windows.

1 42. A method according to claim 41 further comprising identifying a current position and
2 navigation direction of the viewer and using said position and said direction as an input to the
3 algorithm for selecting the subset of display windows to be rendered to memory.

1 43. A method according to claim 41 further comprising recording one or more
2 movements and speed of the viewer and using said movements and speed as an input to the
3 algorithm for selecting the subset of display windows to be rendered to memory.

1 44. A method according to claim 41 comprising recording all or part of a history of
2 viewer activities and using this data as an input to the algorithm for the purposes of selecting
3 the subset of display windows to be rendered to memory.

1 45. A method according to claim 41 comprising the recording of the last modification
2 date and time of rendered material content and using this data as an input to the algorithm for
3 the purposes of selecting the subset of display windows to be rendered to memory.

1 46. A method according to claim 41 whereby the updating of display windows with
2 animated or interactive material content which are out of view or far from the viewer, but
3 which the algorithm determines are soon likely to be in view and near to the viewer, are put
4 temporarily into a suspended state so that the animation or interactivity can be rapidly
5 resumed when needed.

1 47. A method according to claim 1 and claim 41 comprising limiting or suspending
2 computer resources allocated to the rendering of a subset of display windows to memory
3 whenever the viewer's position is changing.

1 48. A method according to claim 1, claim 41 and claim 47 whereby priority is given to
2 display windows with material content that is less computer-resource intensive, so that these
3 display windows are more likely to be selected as part of the subset of display windows to be
4 rendered to memory, are more likely to remain part of the subset, and are allocated more
5 computer resources while part of the subset.

1 49. A method according to claim 1 comprising a two part security key to protect the
2 integrity of the cross references for a particular virtual space, wherein the public key is
3 provided to the viewer in order to decrypt the cross references that have been encrypted with
4 the private key.

1 50. A method according to claim 49, wherein the cross references are signed with the
2 private key and the public key is provided to the viewer in order to verify the authenticity of
3 the cross reference signature.

1 51. A method according to claim 1, further comprising recording for subsequent access
2 by the viewer, the display window position and/or network address or storage location of
3 material content chosen by the viewer.

1 52. A method according to claim 1, further comprising recording and/or storing data
2 about the position, simulated movements and interactions executed by the viewer.

1 53. A method according to claim 1 and claim 52 comprising the storage of data
2 representative of the movements and interactions executed by viewers, the collation of this
3 data from multiple viewers, and the representation of the data in a graphical format.

1 54. A method according to claim 53 wherein the graphical format is a contour map.

1 55. Apparatus for organizing and presenting material content on a display to a viewer, the
2 apparatus comprising:

3 a display,

4 means for mapping a plurality of display windows within a three-dimensional virtual
5 space so that each display window is allocated a specific and predetermined
6 position,

7 means for rendering each display window in three-dimensional perspective according
8 to its position and angle relative to the viewer's position in the virtual space,

9 means for cross referencing the position of each display window to the network
10 address or storage location of the material content that is designated to be
11 rendered in that particular display window at a particular time based on at
12 least one predetermined condition,

13 means for selecting, retrieving and preparing material content for possible subsequent
14 display, according to a predetermined algorithm

15 means for selecting and rendering prepared material content within its cross-
16 referenced display window, according to a predetermined algorithm

17 means for navigation controlled by the viewer that changes the viewer's position in
18 such a manner as to simulate movement through a plurality of predefined
19 channels in the virtual space.

1 56. Apparatus according to claim 55 further comprising interaction means to enable the
2 viewer to interact with the material content displayed in at least one of the display windows.

1 57. Apparatus according to claim 55 wherein the navigation means is adapted to change
2 the viewer's position at different rates, simulating movement at different speeds through the
3 three-dimensional virtual space.

1 58. A virtual space manager comprising a content configurator that includes the interface
2 for the creation, maintenance and updating of the configuration, which incorporates a
3 plurality of cross references of content material to render in display windows.

1 59. A virtual space manager according to claim 58, further comprising a display window
2 registry tool for the management of the ownership and transfer of, and transactions relating
3 to, display windows.

1 60. A virtual space manager according to claim 58, further comprising an auction tool
2 enabling the competitive bidding for transactions relating to display windows and other
3 objects.

1 61. A virtual space manager according to claim 58, further comprising a browser
2 download manager enabling the monitoring of the browser downloads and adjustment of the
3 default configuration of the downloaded browser.

1 62. A virtual space manager according to claim 58, further comprising a map manager
2 tool enabling the creation, maintaining and updating of the map of the virtual space.

1 63. Apparatus according to claim 55, further comprising means for allocating fixed
2 numerical coordinates to each unique position of a display window in order to specify its
3 location in the virtual space.

1 64. Apparatus according to claim 55 wherein the display comprises any one of a
2 computer screen, a television screen, a screen attached to or part of a games console, a
3 personal digital assistant screen, a cell phone display, a projection, a pair of projection
4 spectacles, a cerebral implant display, a pair of virtual reality spectacles, and other digital
5 display mechanisms.

1 65. Apparatus according to claim 55, further comprising interaction means to enable the
2 viewer to interact with the material content displayed in at least one of the display windows.

1 66. Apparatus according to claim 65 wherein the interaction means comprises at least one
2 of a computer keyboard, a mouse, a joystick, a game pad, a games console controller, virtual
3 reality gloves, a trackpad, a trackball, a cerebral implant, an eye movement detection device,
4 a motion detection device, and a touchscreen.

1 67. Apparatus according to claim 55 wherein the navigation means comprises any one or
2 more of a computer keyboard, a mouse, a joystick, a game pad, a games console controller,
3 virtual reality gloves, a trackpad, a trackball, a cerebral implant, an eye movement detection
4 device, a motion detection device, and a touchscreen.

1 68. A browser for organizing and presenting material content on a display to a viewer,
2 comprising one or more stored sequences of instructions which, when executed by one or
3 more processors, cause the one or more processors to perform the steps of:
4 mapping a plurality of display windows within a virtual three-dimensional space so
5 that each display window is allocated a specific and predetermined position in
6 the space,
7 rendering each display window in three-dimensional perspective according to its
8 position and angle relative to a viewer's virtual position in the virtual space,
9 cross-referencing the position of each display window to a network address or storage
10 location of the material content that is designated to be rendered in that
11 particular display window at a particular time based on at least one
12 predetermined condition,
13 allocating at least part of the three-dimensional virtual space to display windows
14 whose content is not chosen or determined by the viewer,
15 selecting, retrieving and preparing material content for possible subsequent display,
16 according to a predetermined algorithm,

17 selecting and rendering prepared material content within its cross- referenced display
18 window, according to a predetermined algorithm,
19 providing a means of virtual navigation that changes the viewer's position in the space
20 in such a manner as to simulate movement through a plurality of predefined
21 channels in the virtual space.

1 69. A browser according to claim 68 in which the viewer is not able to edit the cross-
2 references.

1 70. A browser according to claim 68 in which the viewer is not able to alter the position
2 of display windows in the virtual space.

1 71. A browser according to claim 68 comprising a first part adapted to run at high priority
2 to control the display of a virtual three-dimensional space, and a second part, adapted to run
3 at a lower priority, which controls the updating of material content in display windows.

1 72. A browser for retrieving pages of material content over a computer network,
2 comprising:
3 means for selecting material content for display, according to a predetermined
4 algorithm,
5 means for cross-referencing the position of each display window to a storage location
6 of selected material content based on at least one predetermined condition,
7 means for allocating at least part of a three-dimensional virtual space to display
8 windows whose content is not chosen or determined by the viewer, and
9 means for retrieving and rendering selected material content within its cross-
10 referenced display window, according to a predetermined algorithm.

1 73. A method of facilitating the navigation and display of material content, the method
2 comprising
3 providing a means for performing the steps of:

4 mapping a plurality of display windows within a virtual three-dimensional
5 space so that each display window is allocated a specific position in
6 the space;
7 rendering each display window in three-dimensional perspective according to
8 its position and angle relative to a viewer's virtual position in the
9 virtual space;
10 cross-referencing the position of each display window to a storage location of
11 the material content that is designated to be rendered in that particular
12 display window at a particular time based on at least one
13 predetermined condition;
14 allocating at least part of the three-dimensional virtual space to display
15 windows whose content is not chosen or determined by the viewer;
16 selecting, retrieving and preparing material content for possible subsequent
17 display;
18 selecting and rendering prepared material content within its cross- referenced
19 display window;
20 providing virtual navigation that changes the viewer's position in the space to
21 simulate movement through a plurality of channels in the virtual space;
22 receiving a financial payment from a third party content provider; and
23 granting, to the third party content provider, a right to specify a network address or
24 storage location of the material content.

1 74. A method according to claim 73, further comprising enabling and recording a transfer
2 of the right in exchange for financial payment.

1 75. A method according to claim 73, further comprising the steps of:
2 providing an auction system inviting financial bids for the right; and
3 awarding the right to a highest bidder, provided predetermined conditions are met.

1 76. A method according to claim 1 or 73 comprising providing advertising opportunities
2 in the three-dimensional virtual space in exchange for financial payments.

1 77. A method according to claim 1 or 73 comprising providing services of any
2 description in exchange for financial payments.

1 78. A method according to claim 1 or 73 wherein a viewer's navigation into a restricted
2 area of the three-dimensional virtual space is allowed for a particular period of time in
3 exchange for financial payment.

1 79. A method according to claim 1 or 73 comprising providing, in exchange for financial
2 payment, added-value services for viewers comprising one or more of: avatar companions,
3 guides to navigation, the ability to navigate simultaneously and interactively with one or
4 more other actual viewers, e-commerce support, and financial services including foreign
5 exchange, credit and budget planning.

1 80. A method according to claim 1 or 73 comprising imposing charges on transactions
2 between viewers and display window rights holders that were initiated within or mediated by
3 the three-dimensional virtual space.

1 81. A method according to claim 73, wherein the means for performing the steps is a
2 browser provided for download from a computer network or delivered on physical storage
3 media.

1 82. A method according to claim 1 comprising utilizing the three-dimensional virtual
2 space to enable: Internet browsing, virtual stores, virtual supermarkets, virtual shopping
3 malls, virtual retail catalogues, knowledge management, virtual exhibitions, medical records
4 management, virtual hospital patient management, virtual galleries, virtual museums,
5 entertainment choices, tourist guides, TV guides, news digests, travel/hospitality option
6 guides, virtual trade fairs and photo libraries.

- 1 83. A method according in claim 1, wherein at least some of the material content itself
- 2 comprises one or more three-dimensional virtual objects or spaces.